

Project and site organization of a NATM tunnel project on the example of the Koralm tunnel

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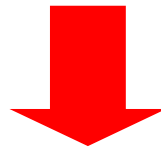


Requirements for a successful application of NATM

- Design, which considers ground quality and behavior
- Appropriate monitoring program
- Construction contract
- Site organization
- Competent staff on site
- Safety management plan
- Good workmanship

Requirements for a successful application of NATM

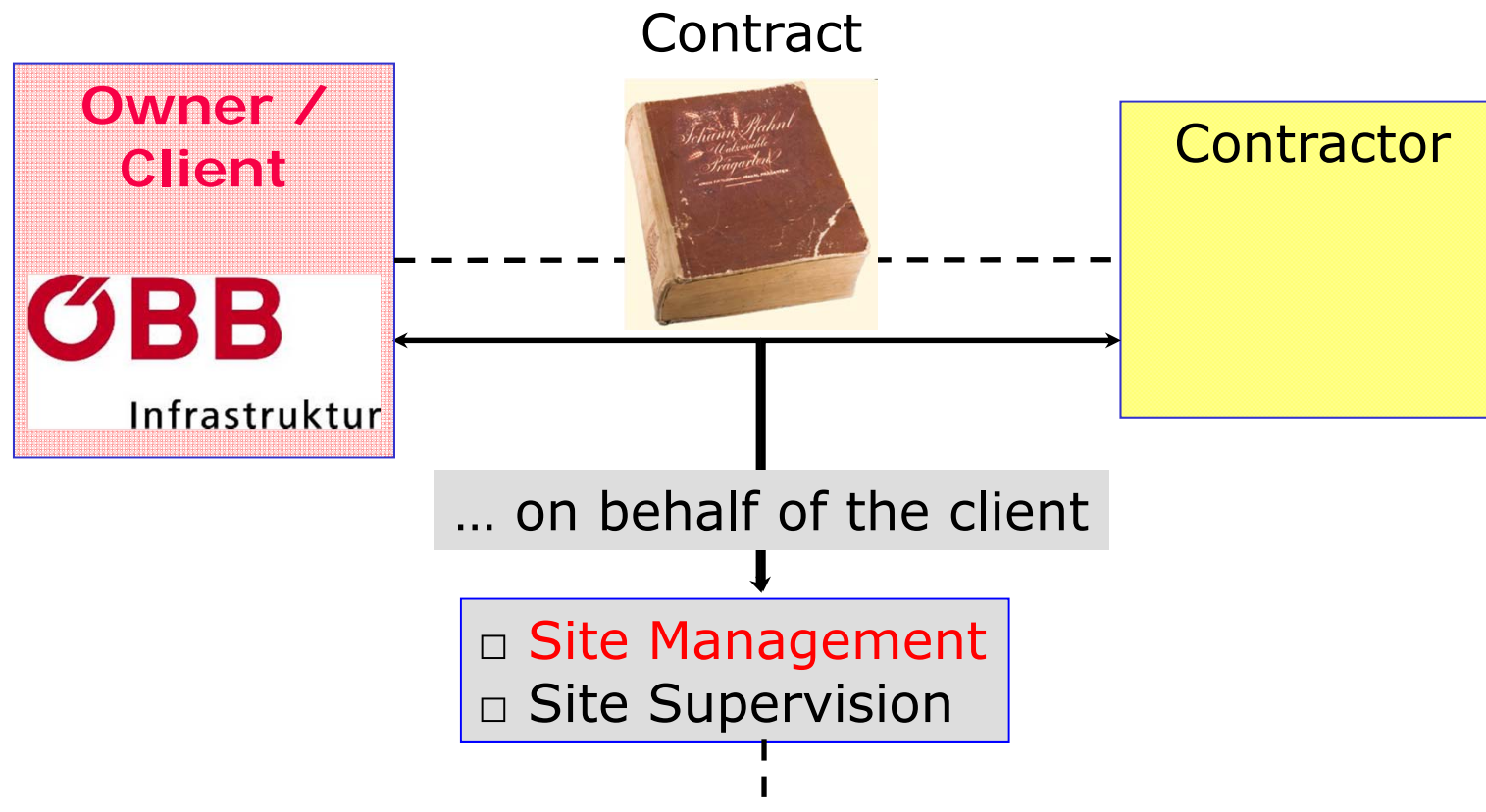
- Construction contract allowing modifications of excavation and support during construction
- Site organization, allowing a flexible response to changing behavior



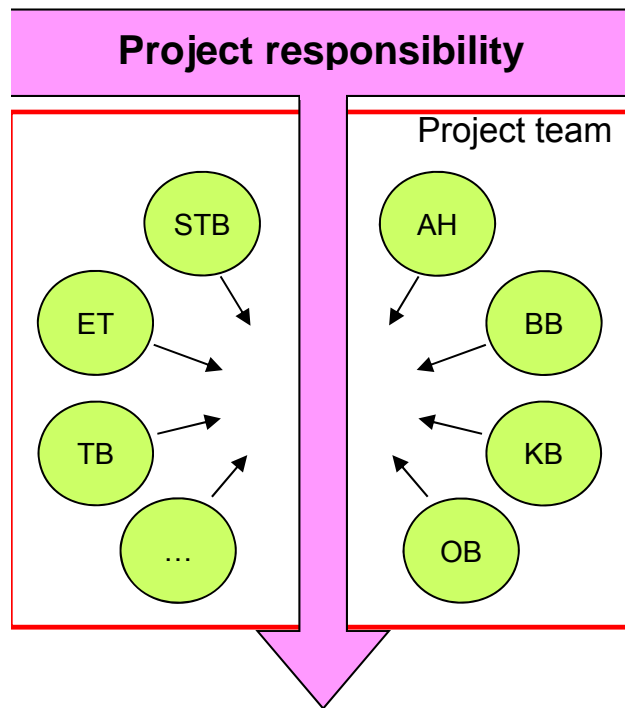
- Competent staff on site
- Safety management plan

Remark: this is also recommended for TBM tunneling!

Project and site organization of a NATM tunnel project

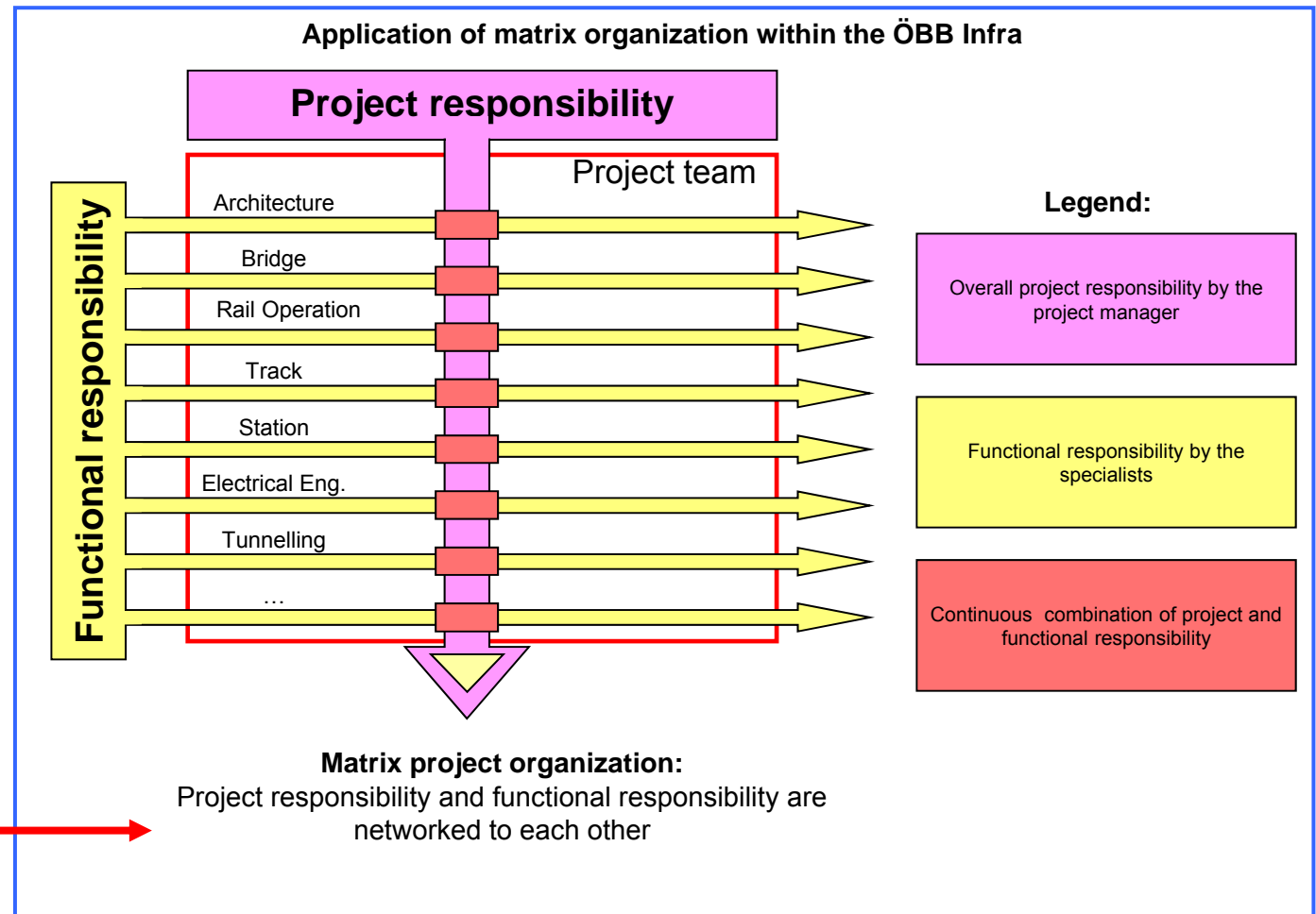


Matrix organization of the client ÖBB



Project organization:

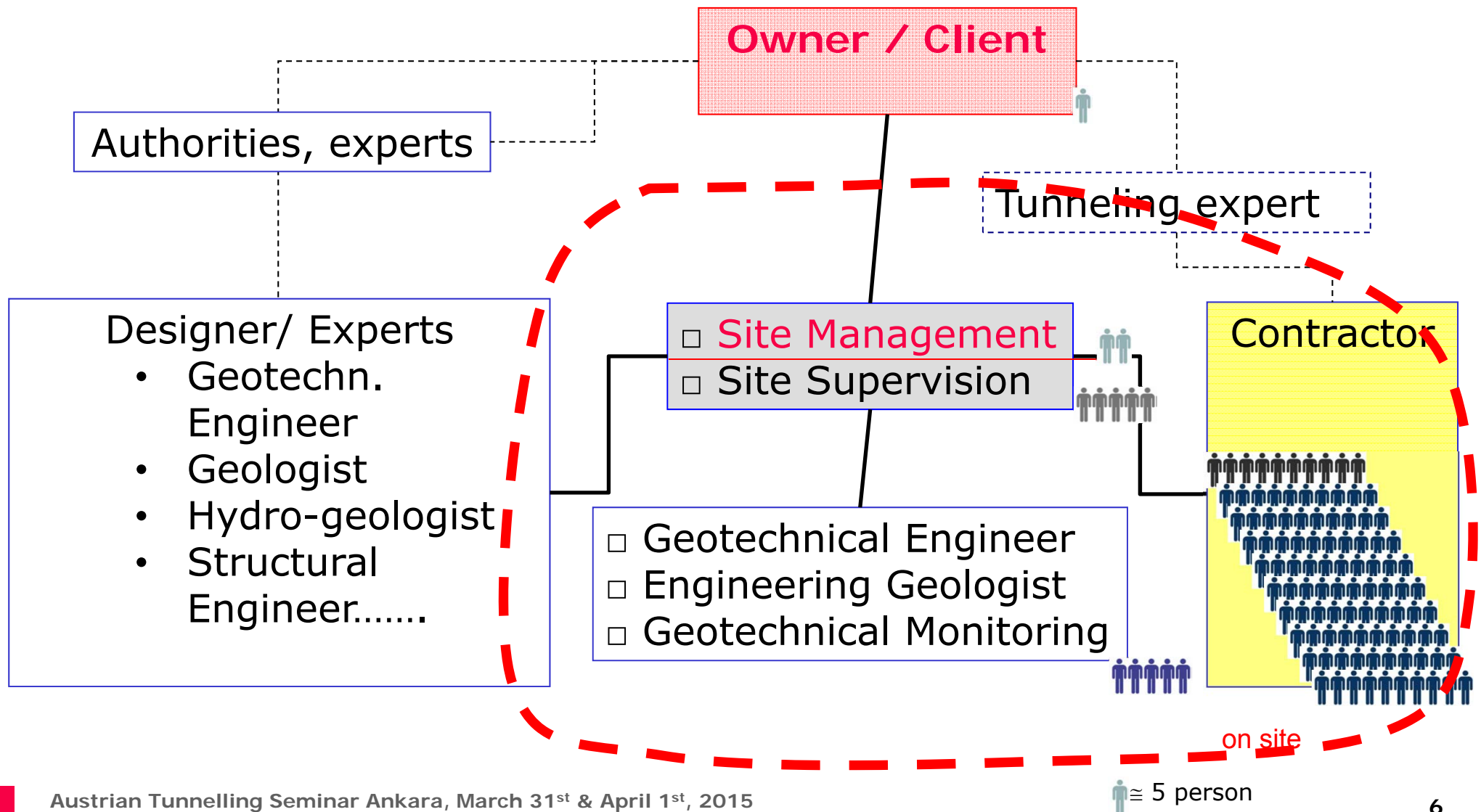
The management of the project is located at the project manager
Specialists are integrated into the project as advisors



Matrix project organization:

Project responsibility and functional responsibility are networked to each other

Site organization of the client ÖBB for a NATM tunnel



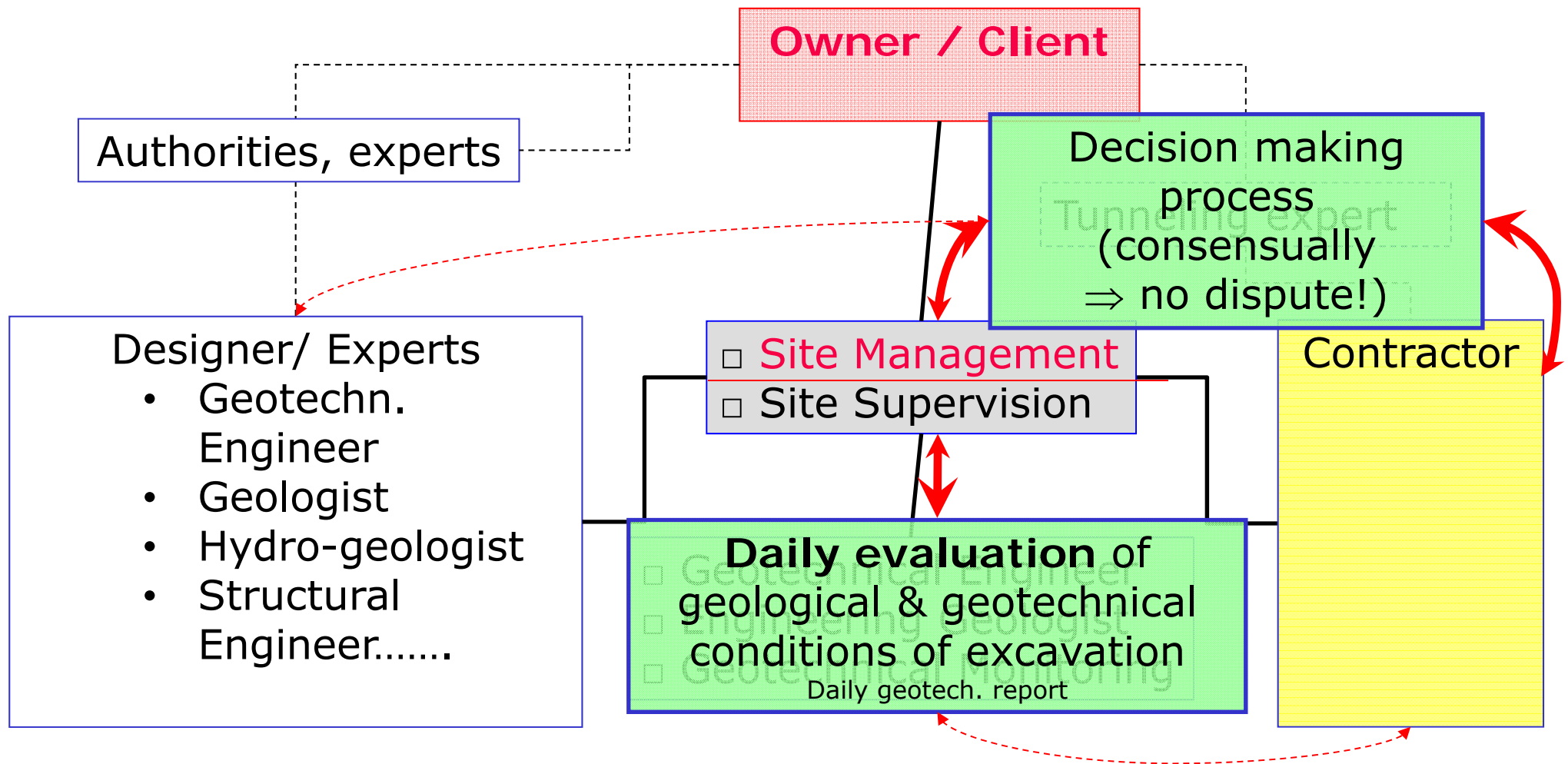
Changing behavior on the example of KAT1



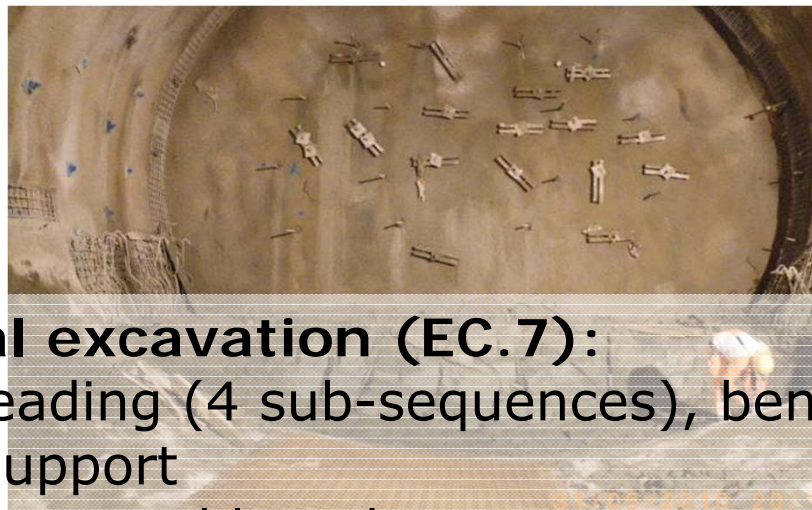
Full face excavation (EC.5):

- ❑ full face excavation
- ❑ no face support
- ❑ 1,70 m round length

Site organization for a flexible response to changing behavior



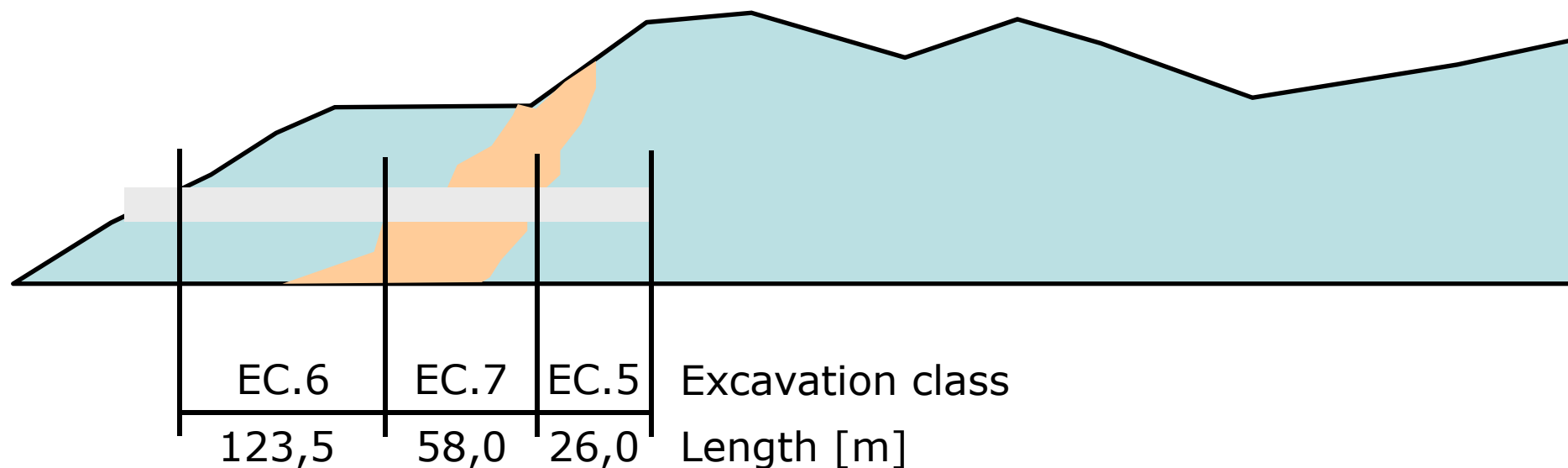
Changing behavior on the example of KAT1



Sequential excavation (EC.7):

- top heading (4 sub-sequences), bench, invert
- face support
- 1,00 m round length

Classification on site on the example of Lot KAT1



Contract



Excavation class	EC.5	EC.6	EC.7
Round length	1,70 m	1,30 m	1,00 m
Ø daily advance	5,5 m / d	5,2 m / d	3,0 m / d
Ø construction time	4,36 h / RL 2,56 h / m	4,31 h / RL 3,32 h / m	8,00 h / RL 8,00 h / m
Ø material costs [€/m]	€ 3.504,80	€ 6.776,92	€ 10.465,40

Essential aspects for a well-functioning site organization

- **Clear responsibilities** of all project members
- **Competent staff on site** at all times
- **Efficient decision making** allowing for a flexible response
- **Involvement of the client** with competent personnel (project and site management)
- To reduce disputes, decision on excavation and support have to be done concerted between the client and the contractor
- Appropriate project management, site organization and safety management are essential components for successful tunnelling !



Many thanks for your attention!